WESTERN RESEARCH APPLICATION CENTER (WESRAC)

Second Quarter Report
15 February - 15 May 1967

Contract NSR 05-018-071

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Western Research Application Center
Graduate School of Business Administration
University of Southern California
Los Angeles, California 90007

HIGHLIGHTS

1. Calendar: 2nd quarter

Contract with NASA signed	15 Feb.
Mgr., Information Systems employed	15 Feb.
WESRAC specialists visit the "Facility"	23-24 Feb.
WESRAC moves to own buildings	31 Mar.
Mgr., Engineering & Scientific Applications hired	3 Apr.
NASA tape received	5 Apr.
News release announcing WESRAC	14 Apr.
First two clients actually signed	8 May
WESRAC on TV	9 May
Marketing staff hiring completed	15 May

2. Even in the West, the NASA Bank does not sell itself at prices to cover costs. Marketing efforts are required and concentration in this area with coordinated advertising, publicity, and promotion have begun.

3. WESRAC service departments--Information Systems and Engineering & Scientific Applications--are staffed and training. The flow of information from the NASA Bank appears to be adequate. The 1401 appears to be usable and clients have been served.

4. WESRAC personnel number 12 full and 8 regular part-time employees.

5. Fees for service at WESRAC are as follows:

	Retrosearch Unit Cost (1 report)	Progress Search Annual Unit Cost (12 reports)	Annual Minimum Required
Standard Plan	$120.00	$350.00	$5000.00
Limited Plan	165.00	375.00	2500.00
Introductory Plan	190.00	400.00	1000.00

The Introductory Plan is convertible to either of the other two plans within four months. The Limited Plan is convertible to the Standard Plan at any time.

6. Marketing results to May 15 are $6240 income. This was based on merits of the program, and there was no element of donation to the University involved. WESRAC had the tape and the information file to service accounts for only one month prior to May 15.

7. A major problem not solved is to establish the proper mix of service, price, product, and distribution to achieve objectives of adequate breadth of dissemination, while at the same time, realizing sufficient income to support the service.

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WESTERN RESEARCH APPLICATION CENTER
Quarterly Report
15 February - 15 May 1967

I. INTRODUCTION

This second quarterly report on the operations of the Western Research Application Center has been prepared in compliance with the requirements of Article XIII paragraph A 1, National Aeronautics and Space Administration Contract No. NSR 05-018-071.

This report covers the period February 15 to May 15, 1967 and is the second report submitted under this contract. In view of the fact that the final contract agreement and signature were not completed until February 15, this is actually the first quarter of funded operation. The report is confined to events taking place between the dates shown with one or two exceptions where reference is made to events previously reported.

During this period considerable emphasis has been given to staffing, training and the establishment of a physical plant for operations. Marketing, and its related activities, has been getting increased attention toward the end of the period in order to better implement the policy decision that financial support was more important than numbers of clients. A major effort was also required to establish the Information Systems group, to ground them in use of the computer tape and its composition by a visit to the "Facility," and to establish a practical method of use for our computer, the IBM 1401.

II. PERSONNEL & STAFF

The personnel connected with the operations of WESRAC are now adequate to support its operation during the immediate future. Additional employees will be hired on a part-time basis primarily as support to the present staff.

WESRAC now has 12 full-time employees, 9 regular part-time employees and others on call. A list of their names, experience and educational background is attached as Appendix I. They are assigned to the following departments:

DEPARTMENT	REGULAR FULL-TIME	REGULAR PART-TIME
Administrative	3	1
Marketing	4	1
Information Systems	3	4
Engineering & Scientific Applications	2	3
TOTAL	12	9

One member of WESRAC who was hired primarily for the feasibility study and for whom there was no position in the current operating organization has left, and twelve new people have been added during the quarter. It is anticipated that one computer consultant and one part-time graduate student will conclude their services for the Information Systems group on June 30.

During this quarter, personnel policies have been prepared for both full-time salaried and part-time employees.

The search for good people available within established budgets has been a problem both in administrative and support areas. Secretarial help and computer personnel have required special attention. The personnel department of the University, newspaper advertising, specialized agencies, private employment lists, and help from personnel offices of large companies, in addition to individualized references, have all been utilized.

III. PHYSICAL PLANT & EQUIPMENT

During this quarter the University redecorated and made available the two modified structures referred to in our earlier report and the WESRAC team was moved into its own quarters on March 31. One of these buildings is devoted entirely to the Information Systems group and the other has the Administrative offices, Marketing, and Engineering and Scientific Applications.

Adequate furniture and standard office equipment has been provided for and delivered. Specialized equipment in the form of a Microfiche reader-printer (Filmac 400B), special microfiche filing cabinets (Steelcase) and a copier (SCM Coronastat 55) have been acquired. The large automatic microfiche printer initially under consideration is not being evaluated at this time in view of the recent instructions from the NASA headquarters, Dissemination Branch, to obtain all full documents from the Facility. While full compliance with this change in policy would reduce our ability to provide rapid service, it is expected that delivery from Washington will be possible on a two-week basis.

The computer is discussed below in the Information Systems section.

IV. INFORMATION SYSTEMS

A manager for the Information Systems group, Mr. William Holt, was hired during this quarter, and he has acquired a supporting staff which makes possible efficient operation in this area. As an immediate introduction to his responsibilities, and for training purposes, Mr. Holt visited the centers at the Universities of Pittsburgh and North Carolina, February 21 and 22, where complete cooperation was received. Then as head of a team from WESRAC composed of himself, Mr. Joseph Rue (Manager of the Graduate School of Business Administration Computer Facility) and Dr. Michael White (Associate Professor of Quantitative Analysis and consultant to WESRAC on Programming), Mr. Holt attended a briefing at the NASA Scientific & Technical Information Facility, College Park, Maryland on February 23 and 24, 1967. We are told that this group did a superior job of absorbing indoctrination.

The prime purpose of our team visit to the Facility was to become familiar with how the computer tape was developed and the mechanics of indexing and abstracting. It also served the purpose of familiarizing our computer people with the program and methods used by the Facility in utilizing the computer tape and servicing information requests. It gave our Information Systems Manager personal contact with the appropriate individuals in Washington with whom he could work out future problems related to information handling. Finally the visit satisfied Headquarters requirements for sending the computer tape to WESRAC for use as part of this Regional Dissemination Center.

The NASA tape for WESRAC use arrived on the 5th of April, and since that time our computer and Information Systems people have been developing their methods of operation in order to maximize the performance of our IBM 1401 computer. As of the end of the quarter, time necessary for searching the tape as received has been cut in half.

Since the tape arrived, almost all other necessary material to make up our NASA bank has arrived and appears to be arriving on a regularly scheduled basis. Also a programmer had been employed on a full-time basis to assist in early development of operating methods. It should be noted that 1401 operations have been discussed with other centers who have had 1401 experience in order to utilize the development work already done.

A cost program has been in continuous effect to establish cost estimates based on projected volume of operations and to record current costs even though these are completely unrealistic until an operating volume has been reached. During these early stages, however, it is felt that unusual costs can be charged to training and program development. Cost results in other centers and estimates on volume have provided our basis for planning.

V. MARKETING

A. SALES. Client seeking began seriously in April when the computer tape of information arrived and it became possible to offer service to the organizations who bought our program. It was decided at this time to make our initial major effort in the Los Angeles area with a list of some

300 organizations which had been previously exposed to the idea of using the NASA file as a source of information and who appeared to have need for at least 30 searches during the year.

It had previously been concluded that this program could not be sold by any other means than on a face-to-face basis. We also found that clients who were expected to sign up easily could not in fact be signed up in May when it came time to actaully secure contracts and checks. It was quickly learned therefore that our program would not sell itself and that major additional efforts would be required to meet the goals we have set for WESRAC during our first year.

With a marketing staff of two in April, the number of calls that could be made became the limiting factor. Letter efforts to establish appointments were helpful only in providing a basis for beginning a conversation. We found that letters addressed to the individual we wished to contact frequently never reached him, and it is assumed that secretaries habitually make the decision on what their bosses will or will not see. The most efficient approach became one of assigning one marketing man to make the appointments for the second man who makes the personal calls. A maximum of three calls a day appears to be possible in this area in view of the distances to be travelled, the virtual impossibility of setting up calls at our convenience, and the unpredictable amount of time required for the actual presentation.

By the end of the quarter, one full-time and one half-time marketing assistant had been added. Also we assigned our Manager of Engineering &

Scientific Applications to the marketing job, in addition to his other duties, until client application work requires his full time. Consequently, as of May 15, three-and-one-half men plus the Manager of Applications and part-time of the Director all have been assigned to marketing efforts.

These actions to increase the marketing pressure should not be construed as anything other than early recognition of the need for developing an operating base for WESRAC. The program is almost invariably received with interest and with recognition of its value. The philosophy of our marketing effort during this quarter has been to generate business on a break-even basis and to emphasize financial support rather than numbers of clients. Subsequent plans include work with companies which have only modest requirements for service from WESRAC and correspondingly smaller financial support potential.

As of the end of the quarter, two clients representing $6,000 income have signed agreements. One other company requested a trial search for $240.

With only a month of selling in this quarter, during which actual service from WESRAC could be offered, it is the considered conclusion of the staff at WESRAC that momentum is gaining and that there will be a snow-ball effect in the acquisition of clients as we go further into the year.

B. PRICES. The fee schedule at WESRAC revolves around what is called the Standard Plan. This provides three services - the Retrosearch, the Progress Search, and the Conference, Seminar, Workshop type meetings. The

Retrosearch provides retrospective information from the complete NASA file. The Progress Search provides 12 monthly reports on current information as it comes in. The Conferences are self-explanatory and will be presented at irregular intervals on subjects of interest to groups.

The Standard Plan is for companies that can use 30 to 40 searches a year and can therefore justify a commitment to spend $5,000 during that time by using any combination of Retrosearches at $120 each, Progress Searches at $350 per year, or Conferences at prices specified for each conference.

We have decided during this quarter to also provide two other lower commitment plans at higher unit costs. The Limited Plan with a $2,500 commitment has a unit cost of $165 for the Retrosearch and $375 for the Progress Search. The Introductory Plan requires a commitment of $1,000 with unit costs of $190 and $400 respectively. The Introductory Plan has a feature, however, which should make it most popular - it is convertible within four months to either the Limited or Standard Plans with corresponding increase in commitment for use during the year and decreases in the unit costs.

During the quarter we have developed agreement, or contract, forms which have been approved by the University and which describe the three plans. These are included as Appendix II.

C. PUBLICITY, ADVERTISING, SALES PROMOTION. The formation of the Western Research Application Center was announced to the newspapers on April 14 in a joint announcement by the Research Institute for Business &

Economics (USCRIBE) and the Graduate School of Business Administration (copy attached Appendix III).

A TV announcement on NBC Channel IV was arranged by the University News Bureau for 6:45 P.M., May 9. This is a regular news hour and our part consisted of an introduction by the news commentator, camera views of our computer in action, and a two-minute appearance and explanation of WESRAC by its Director.

A half-hour radio program to be heard on KFI Sunday, May 21 from 5:00 to 5:30 P.M. was recorded on tape May 12. KFI is a major radio station in the Los Angeles area which broadcasts the Monitor program on weekends and the Dodger baseball games. The half hour on which we are to be heard normally follows the baseball game and is a regular period devoted to activities at the University of Southern California. The program consisted of a series of questions about WESRAC and responded to by the Director of WESRAC and the Director of USCRIBE. A small advertisement was scheduled to appear prior to this program and invited interested individuals to listen.

The following lists of individuals and organizations for a mailing program have been acquired during this quarter. These names represent individuals who have expressed an interest in NASA materials and who are located here in California. They have:

1. Requested information from the NASA office at Jet Propulsion Laboratories.

2. Requested information from the NASA Western Operations Office.

3. Been on tech brief mailing list and have been followed by the Maryland project.

A letter has been composed for mailing to these groups and, in order to test different approaches, will be mailed in several different ways.

Every available opportunity is being used to announce the WESRAC Program to business groups. Where possible, WESRAC will use the complete program time to tell its story.

An article in Design News, a national magazine, was written by the west coast editor and printed in the March 15, 1967 issue of Design News. (Appendix IV) While this helps all NASA dissemination activities because of the national coverage, we feel that the editor covered WESRAC operation favorably for us.

Forms for control and operation of marketing activities have been developed and some are attached as Appendix V. The Client Data Record and the Pre-call Client Interest Form provide preliminary data prior to the call on a prospective client. The Call Report Form is used to report the results of each call and gives a day-to-day record of contacts.

Examples of distinctive stationery and cards are also included in Appendix V.

V. ENGINEERING AND SCIENTIFIC APPLICATIONS

The manager for this group, Mr. Milton Karp, has been employed during

this quarter and brings strong engineering training as well as consultant and broad practical experience to WESRAC (see Appendix I). His group will be made up of regular part-time specialists and specialists on call from the University. Full cooperation from the Engineering School was approved April 20 and our build up of specialists required will depend on the types of demands generated by clients.

Based upon our conclusion that personal attention by these specialists is the strongest reason for a client to buy WESRAC service and because these men are our prime contact with clients after they have bought the service, we feel that the Engineering & Scientific Applications group must be especially well selected and trained.

The principal form developed for use in this group during the quarter is the self-explanatory Search Information Sheet (Appendix V).

VII. CONCLUSION

The development of the Western Research Application Center represents all of the opportunities and problems that come with putting together a small company. Sales and distribution are not instant. WESRAC is at the beginning of this phase and the relationship of price, service, product and objectives are still in the experimental stage. Establishment of the proper mix between these four factors must still be established for successful operation.

Because of serious delays in getting this project under way, consideration should be given soon to two additional matters:

1. The desirability of extending the current contract for two or three months.

2. Early consideration of renewing the contract for the second year so that the project can continue smoothly without unacceptable delays and gaps from one contract to the next.

Certain policy decisions need also to be made. For example will this center be requested to reproduce its own hard copy or should it be obtained from "the Facility"? Or are there breaking points (e.g., WESRAC reproduces over 20 pages, the Facility under 20 pages) which would mean that both the Facility and WESRAC will produce documents? The planning and purchase of equipment depends on these factors.

WESRAC now appears to be an established operation. The various segments are basically staffed and adequate training has been given to seventy per cent of the personnel. Physical equipment is adequate for the time being. While development is always slower than hoped for, the ensuing six months should reveal definite clues on methods of operation which will be most successful here in the west.

Appendix I

THE WESRAC STAFF
Names & Background

Appendix I

WESRAC Personnel
15 May 1967

Full Time

Holt, W. H. Mgr., Information Systems

Education: Oklahoma Univ., BS Engineering (Petroleum) 1960
Harvard University, MBA 1962

Experience: Asst. to VP, Cary Instruments 1962-65

Karp, M. A. Mgr., Engineering & Scientific Applications

Education: College of the City of New York, BCE, MCE 1938
New York University

Experience: Managing Director, Mannesmann-Rheem International, Munich 1965-66
Management Consultant
Vice President, Empire Steel Buildings 1954-60

Kleinhen, W. G. Mgr., Marketing

Education: Harvard University, BA MBA 1952

Experience: Resident General Mgr., Europe, Air Reduction Co., 1965-66
Sales Management, Air Reduction Co. 1952-65

Oulie, A. K. Director, WESRAC

Education: Univ. of California AB (Economics) 1936
Harvard University MBA (Industrial Mgt.) 1939

Experience: Director Corporate Planning, Garrett Corp., 1959-63
Mgr. Marketing Research & Marketing Analyst, General Petroleum Corp. 1946-59

Gormsen, J. H. Marketing Assistant & Public Relations

Education: University of Michigan, BA Journalism 1942

Experience: Director Public Relations, Liesure World Foundation
Public Relations Officer, U. S. Navy
Commander U. S. Navy, Retired 1964

Stephens, F. C. Marketing Assistant

Education: Univ. of Utah, BSEE 1950
Harvard Univ., MBA 1955

Experience: Project Mgr., Lear Jet Corp.
National Sales Mgr., General Technology Corp.
Senior Project Engineer, Waste King

Komoto, D. T. Programmer

Education: Waseda University, BA, MA 1959
Univ. of Southern Calif., MBA 1967

Experience: Salesman, Pacific Coast Commercial, Inc.
Salesman, United Commercial, Inc.
Salesman, Cline Stewart Co.

Bartok, Nancy - Secretary, Engineering

Cademartori, Mary - Secretary, Marketing

Lehky, Marian - Secretary, Director

Malinouskas, Rose Marie - Adm. Asst., Information Systems

Parkins, Lynda - Receptionist

Regular Part-Time

Dewing, D. L. - Engineering

Ehrenreich, J. W., Prof. - Director, USCRIBE

Fojtik, C.* - Information Systems

Johnson, R. M. - Marketing

Kirpalani, R. - Engineering

Tolivar, A. F. - Analyst (Engineering & Information Systems

Wadman, D. - Information Systems

White, C. M., Prof.* - Consultant (Information Systems)

Young, Susan - Information Systems

* Leaving June 30

Appendix II

CLIENT AGREEMENTS
The Standard, Limited, & Introductory Plans

STANDARD PLAN
WESRAC PROGRAM PROPOSAL

The Western Research Application Center (WESRAC), a Division of the University of Southern California, proposes to provide a technology dissemination service known as the WESRAC Program, for: _____

_____

the client, commencing on date of client's acceptance, and continuing in effect from year to year until cancelled in writing by either party prior to the commencement of the succeeding year.

The following services will be charged against the annual client fee:

1. RETRO-SEARCH ($120 per search)
   Client specifies his problem or area of interest. WESRAC engineer or scientist will then assist in its definition. WESRAC makes a retrospective search of the NASA Data Bank and other sources (approximately 250,000 items 1962 to date), WESRAC evaluates the findings, discusses them with client if desired, and provides two copies of selected abstracts and computer citations. Normally one copy of full documents selected by client will be provided; additional copies at cost.

2. PROGRESS SEARCH ($350 per year)
   Client specifies his problem or area of interest. WESRAC engineer or scientist will then assist in its definition. Every month WESRAC conducts a selective search through an average of approximately 6,000 additions to the NASA Data Bank for all new innovations within the client's problem or area of interest. Two copies of selected abstracts and computer citations are sent to client immediately. Normally one copy of full documents selected by client will be provided; additional copies at cost.

3. SEMINARS AND WORKSHOPS (participation fees to be announced)
   Member clients may designate representatives to attend WESRAC seminars and workshops on subjects to be announced periodically.

The annual client fee is $5,000 to be paid on receipt of WESRAC's statement. Retro-searches, Progress Searches, Seminars and Workshops are charged during the year against this $5,000 commitment in any combination desired by client up to the total annual fee. Unused portions of the annual fee may not be applied to succeeding service years. Client may request additional searches beyond the basic commitment at listed unit prices.

Neither NASA nor WESRAC represents that it has the right to make, use or sell inventions disclosed, or that the practice of inventions disclosed in NASA-furnished information will not infringe outstanding patents owned by third parties.

Acceptance by the client and the University of Southern California, as evidenced by signatures below, shall constitute an agreement between the parties.

ACCEPTED:

_____

By _____
Date _____

UNIVERSITY OF SOUTHERN CALIFORNIA

By _____
Date _____

WESTERN RESEARCH APPLICATION CENTER
A. Kendell Oulie, Director

Unless accepted, this proposal expires:

_____

LIMITED PLAN
WESRAC PROGRAM PROPOSAL

The Western Research Application Center (WESRAC), a Division of the University of Southern California, proposes to provide a technology dissemination service known as the WESRAC Program, for: _____

_____

the client, commencing on date of client's acceptance, and continuing in effect from year to year until cancelled in writing by either party prior to the commencement of the succeeding year.

The following services will be charged against the annual client fee:

1. RETRO-SEARCH ($165 per search)
   Client specifies his problem or area of interest. WESRAC engineer or scientist will then assist in its definition. WESRAC makes a retrospective search of the NASA Data Bank and other sources (approximately 250,000 items 1962 to date), WESRAC evaluates the findings, discusses them with client if desired, and provides two copies of selected abstracts and computer citations. Normally one copy of full documents selected by client will be provided; additional copies at cost.

2. PROGRESS SEARCH ($375 per year)
   Client specifies his problem or area of interest. WESRAC engineer of scientist will then assist in its definition. Every month WESRAC conducts a selective search through an average of approximately 6,000 additions to the NASA Data Bank for all new innovations within the client's problem or area of interest. Two copies of selected abstracts and computer citations are sent to client immediately. Normally one copy of full documents selected by client will be provided; additional copies at cost.

3. SEMINARS AND WORKSHOPS (participation fees to be announced)
   Member clients may designate representatives to attend WESRAC seminars and workshops on subjects to be announced periodically.

The annual client fee is $2,500 to be paid on receipt of WESRAC's statement. Retro-searches, Progress Searches, Seminars and Workshops are charged during the year against this $2,500 commitment in any combination desired by client up to the total annual fee. Unused portions of the annual fee may not be applied to succeeding service years. Client may request additional searches beyond the basic commitment at listed unit prices. The client may at his option at any time during the service year, convert to the Standard Plan.

Neither NASA nor WESRAC represents that it has the right to make, use or sell inventions disclosed, or that the practice of inventions disclosed in NASA-furnished information will not infringe outstanding patents owned by third parties.

Acceptance by the client and the University of Southern California, as evidenced by signatures below, shall constitute an agreement between the parties.

ACCEPTED:

_____

By _____
Date _____

WESTERN RESEARCH APPLICATION CENTER
A. Kendell Oulie, Director

UNIVERSITY OF SOUTHERN CALIFORNIA

By _____
Date _____

Unless accepted, this proposal expires:

_____

INTRODUCTORY PLAN
WESRAC PROGRAM PROPOSAL

The Western Research Application Center (WESRAC), a Division of the University of Southern California, proposes to provide a technology dissemination service known as the WESRAC Program, for: _____

_____

the client, commencing on date of client's acceptance, and continuing in effect from year to year until cancelled in writing by either party prior to the commencement of the succeeding year.

The following services will be charged against the annual client fee:

1. RETRO-SEARCH ($190 per search)
   Client specifies his problem or area of interest. WESRAC engineer or scientist will then assist in its definition. WESRAC makes a retrospective search of the NASA Data Bank and other sources (approximately 250,000 items 1962 to date), WESRAC evaluates the findings, discusses them with client if desired, and provides two copies of selected abstracts and computer citations. Normally one copy of full documents selected by client will be provided; additional copies at cost.

2. PROGRESS SEARCH ($400 per year)
   Client specifies his problem or area of interest. WESRAC engineer or scientist will then assist in its definition. Every month WESRAC conducts a selective search through an average of approximately 6,000 additions to the NASA Data Bank for all new innovations within the client's problem or area of interest. Two copies of selected abstracts and computer citations are sent to client immediately. Normally one copy of full documents selected by client will be provided; additional copies at cost.

3. SEMINARS AND WORKSHOPS (participation fees to be announced)
   Member clients may designate representatives to attend WESRAC seminars and workshops on subjects to be announced periodically.

The annual client fee is $1,000 to be paid on receipt of WESRAC's statement. Retro-searches, Progress Searches, Seminars and Workshops are charged during the year against this $1,000 commitment in any combination desired by client up to the total annual fee. Unused portions of the annual fee may not be applied to succeeding service years. Client may request additional searches beyond the basic commitment at listed unit prices. The client may at any time within a 4-months' period from the date of the acceptance of this proposal convert to either the Standard Plan or the Limited Plan.

Neither NASA nor WESRAC represents that it has the right to make, use or sell inventions disclosed, or that the practice of inventions disclosed in NASA-furnished information will not infringe outstanding patents owned by third parties.

Acceptance by the client and the University of Southern California, as evidence by signatures below, shall constitute an agreement between the parties.

ACCEPTED:

WESTERN RESEARCH APPLICATION CENTER
A. Kendell Oulie, Director

_____

By _____
Date _____

UNIVERSITY OF SOUTHERN CALIFORNIA

Unless accepted, this proposal expires:

By _____
Date _____ _____

Appendix III

NEWS ANNOUNCEMENT OF WESRAC

UNIVERSITY OF SOUTHERN CALIFORNIA

UNIVERSITY PARK
LOS ANGELES
CALIFORNIA 90007

NEWS BUREAU
PHONE 746-2215

FOR RELEASE

Upon Receipt

A new research application center, to bring down-to-earth knowledge from the nation's 200,000-document aerospace technology information bank to individual industries, has been established at the University of Southern California with the aid of a NASA contract.

That announcement came today from Dr. Robert R. Dockson, Dean of USC's Graduate School of Business Administration. He said a staff of scientists and engineers at the center will work closely with Western industry in the application and profitable use of the nation's multi-billion dollar bank of new, unclassified technological knowledge.

To be known as WESRAC (Western Research Application Center), the new USC facility will be the only one on the West Coast and one of five similar computer-based centers on university campuses in America.

Initially, WESRAC will concentrate its work in the greater Los Angeles area and elsewhere in Southern California, in providing subscribers with information and guidance on new materials, systems, processes and products.

(more)

"This will be a face-to-face relationship, with our staff engineers and scientists working directly with the people in industry who are seeking solutions to various problems -- solutions which someone else has already established," according to Dr. Joseph W. Ehrenreich, director of USC's Research Institute for Business and Economics, of which WESRAC will be a division.

"Most of the data in the vast NASA information bank, to which approximately 5,500 additions are made monthly, have come as a result of the nation's large investments in aerospace and defense research," Dr. Ehrenreich said.

"Major sources of this technology in addition to NASA include the Department of Defense, Atomic Energy Commission, other federal agencies and contractors, American industry and research organizations, as well as numerous foreign sources including some from Iron Curtain countries. WESRAC's job is to help Western manufacturers use this know-how. Hundreds of subjects are included; a few are: electricity and electronics, energy sources, chemistry, medical measurements, manufacturing processes, lasers, life and management sciences, and computer software.

"The basic problem here is the sheer mass of the material itself. With the aid of a computer, WESRAC's staff will search the NASA bank with the interests and needs of specific client companies in mind."

(more)

The far-reaching technology available is by no means restricted to exotic or "other-world" applications for which it was discovered or developed, according to A. Kendell Oulie, who has been named director of WESRAC.

"Already there are numerous examples of American business enterprise applying space-age innovations to create new products, improve current products, processes, and systems, or just to avoid costly duplications of research and development effort."

For example, a precision-casting method that NASA devised for making windtunnel models has been adapted to the production of special industrial valves.

A special alkali silicate paint formulated by NASA as a protective coating for spacecraft is now being used in industry as a remarkably durable lining for steel calcining kettles.

WESRAC will maintain information in several forms. One will be computer tapes, which will be updated monthly. Search of these tapes by subject will provide reference to keyword citations and abstracts of all documents covering the particular subject. After initial screening by WESRAC engineering specialists, and then by the client, selected reports that are relevant to the client companies' specific needs are duplicated and forwarded to the client. This process will be repeated every two weeks as the most current documents become taped.

"With its financial support coming initially from NASA, WESRAC provides its services to client companies on a not-for-profit contract basis. NASA's financial support will be phased out gradually as WESRAC becomes self supporting," Director Oulie explains.

-30-

April 13, 1967

Appendix IV

ARTICLE IN DESIGN NEWS

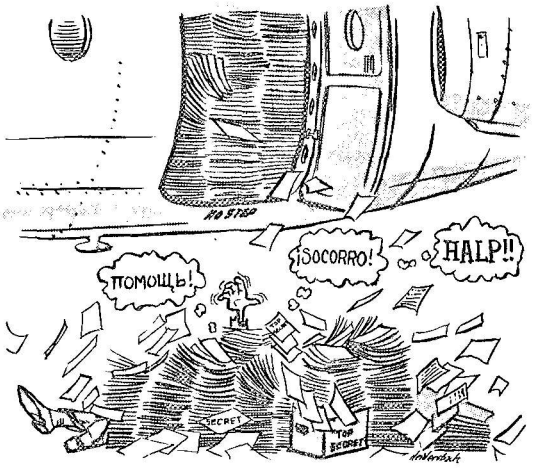
Space Technology Utilization: The Challenge to Creative Imagination

Man's push into space is generating a trail of rocket exhaust, a litter of space junk and a mountain of new technological data. Will these paper piles become another form of space litter—or will they trigger a wave of creative applications? With WESRAC beginning operations in Los Angeles, a new and growing information system now stretches from coast to coast. This report surveys its workings and spotlights its implications for engineers.

R. F. STENGEL, WEST COAST EDITOR

A Wicked Plot to Wreck Country X

One of our friends has a fine Machiavellian mind. His most recent suggestion for destroying our enemies (let's call them Country X) goes like this. Once a week we load aboard a jumbo-sized cargo jet



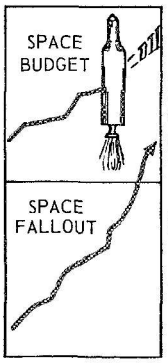
the week's national production of technical reports (including the classified ones), *one copy each*, and airlift them to the capital of X. On arrival, the copies get dumped helter-skelter out the door, and we won't furnish an index, either. The plane departs; end of scheme.

Before you yell "high treason!" consider the predicament of Country X. Here sits a giant pile of technological goodies (they *must* be good; otherwise, why would there be a fraction stamped "top secret"?). Now let's apply Parkinson's Fifth Law: "For any large administration or corporation, the volume of paper maximally generated by its employees is inherently greater than the time available for reading same." Hence, Country X is faced with an impossible dilemma: the X-ians cannot afford to ignore the goodies; but on the other hand, the number of competent technical personnel required to evaluate the contents is roughly equal to the total number of engineers in Country X. Therefore, the X-ians have only a choice between extreme frustration (leave the paper pile alone and fear obsolescence) or extreme engineer shortage (read the stuff after all).

Does this sound like a madman's tale? Perhaps. But we are doing this to ourselves, increasingly. We *are* Country X. And the paper pile from NASA alone grows at the estimated rate of 5500 items per month. Do we hear yells of "help"? Recently DESIGN NEWS published an editorial (Sept. 1, 1966, page 5) "Deorbit the Information, Please . . . " Now we report on the present state of the problem. How did it get that way?

Congressional Conjectures

The Space Act of 1958 has provoked surprisingly little discussion, considering that some rather basic propositions were spelled out, or at least implied, for the first time in cold print. The Space Act implies this line of reasoning:



Ye Congress of ye United States, in SPACE assembled...

SPACE TECHNOLOGY UTILIZATION:

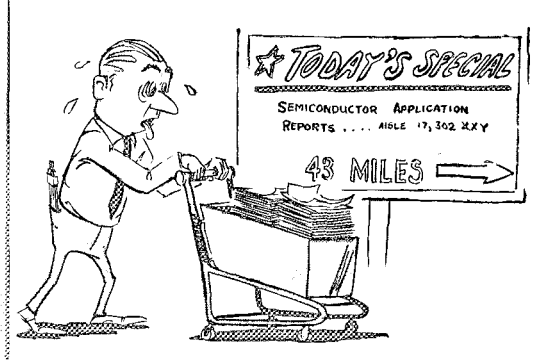
1. We must pursue a space program for reasons of defense, national ego and (undmittedly) for the simple reason that pace is *there*.

2. No matter how much we appropriate ow, the budget requests will go up, cf. 'arkinson.

3. Leaving aside defense projects, even eaceful space projects tend to be highly pecialized, one-off undertakings.

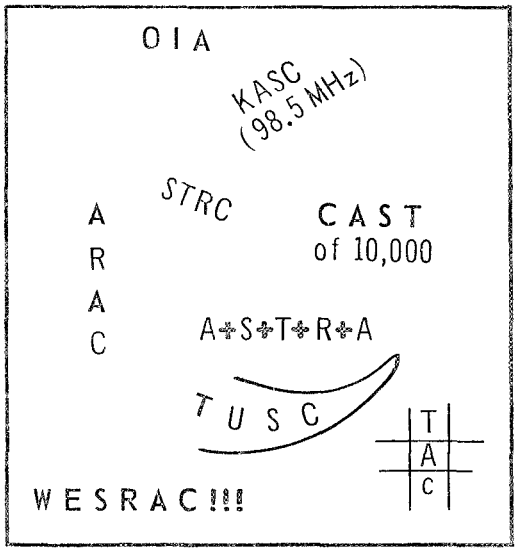
4. *Therefore*, the only way to get these nonies back to earth is to insist on full lissemination of space technology (inluding compulsory transfer of patent ights from contractors to NASA subject o liberal waiver provisions). With luck, his will create sufficient new business to offset the cost (and make the space program politically marketable).

Briefly, then, Congress seems to have publicly accepted the theory that public spending on space research was potentially a good investment in terms of national economic growth. There remained the task of setting up, within or through NASA, an appropriate structure for information dissemination.



Supermarket of Space Data

It is a nearly redundant statement of information theory that every data-processing system has at least three components: input, storage and output. In the case of NASA, the input end is taken care of massively by a variety of reports from contractors, in-house sources, other federal agencies and even monitored sources in foreign countries.



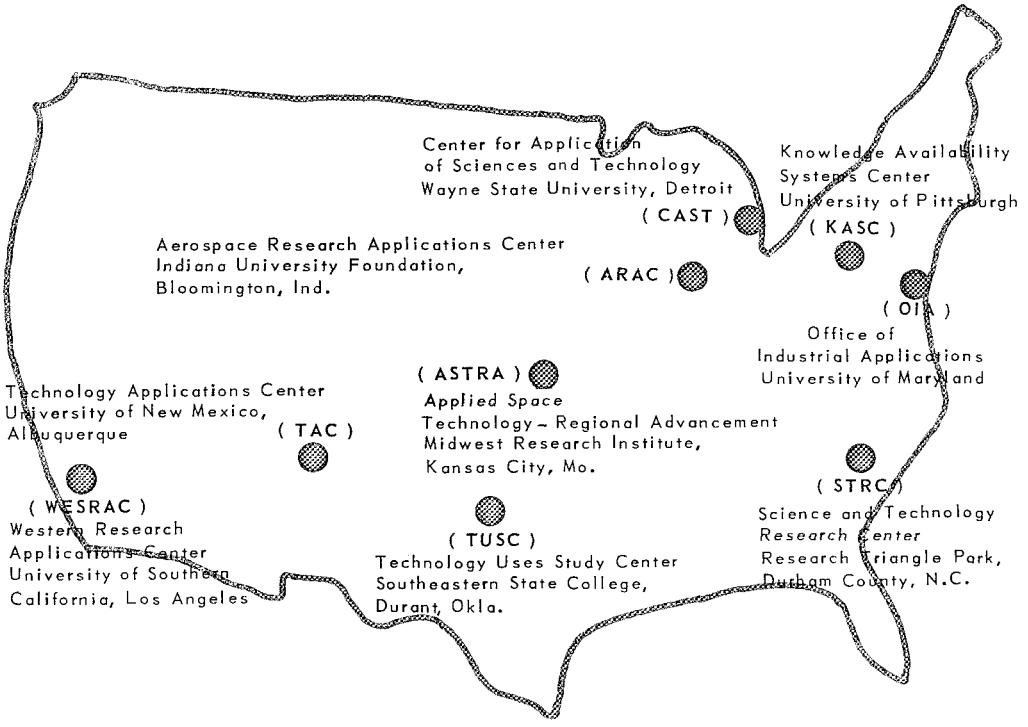
There is a healthy diversity in potential customers and in working approaches. TAC in New Mexico serves a regional concentration of primary industries (gas, oil, mining). Their geo-sciences interests, or the overriding importance of hydrology to the arid Southwest, are obvious to a TAC staff member; would a Marylander find them equally comprehensible?

TUSC in rural Oklahoma encourage small business down to the one-man consultant or lone inventor; WESRAC feels that at the beginning a core of large corporate clients will put a floor under its operations. ASTRA in Pittsburgh already has customers sophisticated in aerospace technology; STRC in North Carolina sees part of its function as catching up with space-wise California and Massachusetts. And so forth . . .

The one common factor shared by all regional dissemination centers is the proximity of a large pool of experts whose university affiliations leave them with disposable consulting time in a flexible schedule. This is probably the decisive competitive edge enjoyed by all centers: even a modestly sized faculty has more specialists "on tap" than any commercial institution could afford to maintain on full-time salary.

Seaching for Subscribers

What do RDC's offer, and how do they work with their clients? NASA/STIF makes the total information intake available to RDC's in form of document index



on computer tape. The key function of RDC's is to find potential users, ascertain their needs and extract from the flood of NASA information the specific data that may help a particular client.

WATCH THIS SPACE FOR IMPORTANT FALLOUT NEWS !

. . . confidential . . .
. . . we regret that at this time . . .
. . . OUR Corporation . . .
. . . proprietary considerations . . .
. . . company policy . . .
. . . what ? fallout ? ? ? . . .

There are two classes of typical situations. A "retrospective search" is a one-shot operation (" . . . send us everything you have on Subject Y"). Given a proper definition of terms and an efficient computer search program (KASC/Pittsburgh boasts a program antithetically called STERILE—System of Terminology for Retrieval of Information through Language Engineering), this takes from 48 hours (for rush jobs) to 2 weeks. Even so, a human specialist is needed to interpret the search request and to determine whether Document X is *really* relevant to the query.

The other class of service is a continuing search of current document intake. In this context the resident part-time specialist (usually a faculty member or a graduate student with industrial experience) becomes indispensible. Initially, he helps the client to formulate an "interest profile", which is updated from time to time. Once the service is under way, he remains on hand to screen computer-retrieved documents and to maintain human liaison with the client.

And at this point we come up against a basic and somewhat puzzling problem: granted that royalty-free access to the NASA knowledge bank has large potential advantages for a company, why has industry been relatively slow to exploit this opportunity?

Superficially, cost is a defensive answer. Retrospective searches on specific problems are fairly inexpensive. Continuing search services (with interest profiles and constant liaison) may run to a basic subscription fee of $5000 per year; some large corporations are reported to pay $20,000 per year. At these rates (which are low to the initiated, but may seem frighteningly high to the novice), executives of small and medium companies face a squeeze: compared to the situation of large corporations, the fee hurts more in the pocketbook, but the benefits to a small product line appear less.

The impression is false; with a small product spectrum, both search scope and cost are correspondingly reduced. But the problem, being psychological rather than financial, is not easily solved. Managers see costs, while engineers *might* see benefits. The question of "subscribe or not" is merely a sharpened version of the smaller company's predicament: that is, weighing the known costs of doing R&D against the unknown (or rather: unpriceable) cost of doing none.

This may explain why some of the early expectations of RDC success were proved overoptimistic. It also underscores the role of the part-time expert from the faculty pool. RDC directors may "sell high", asking company presidents and research chiefs for a corporate commitment. But it takes an engineer to "sell inside" to the company's engineers, to promote the degree of information utilization that will justify the cost of the information service. This leaves two questions to be answered: Is there really such a thing as a technology fallout? Assuming that fallout does exist, do we need more than just a bigger, more thoroughly computerized and cheaper *system*?

Fallout: Fairy Tale or Fact?

For the designer, there are two ways of using a technological advance made elsewhere. He can either adopt the development "as is", with minor modifications, or he can creatively adapt a design idea that may stimulate him to develop an outwardly different hardware item. Let me quote two examples from DESIGN NEWS files.

Some years ago, engineers at Yugoslavia's Mihajlo Pupin Institute took pity on a

(Continued on next page)

friend (engineer-turned-journalist) who had lost both hands in a freak accident. Rather than pass the hat for off-the-shelf prosthetic hands, they decided to design a superior artificial hand and achieved notable success (DESIGN NEWS, Aug. 19, 1964, pp. 44-45). With humanitarianism nobly served, commerce inevitably entered the picture: one man's prosthetic hand, with small changes, is obviously another man's remote-controlled manipulator. A brisk little export business now is under way.

The other example called for adaptation rather than adoption. A German manufacturer had developed a device (DESIGN NEWS, Sept. 15, 1961, pp. 12-13) for automating the surface inspection of bearing balls. Design of this equipment was a two-step process: first define a geometrical scanning path that completely covers the surface of a sphere (software); then conceive of a mechanism to implement this scanning path (hardware). Shortly after publication, Company Z entered the picture, stating that it manufactured bowling balls and had a growing bottleneck in surface inspection. For reasons of centrifugal stress, it is highly doubtful that the hardware would have withstood a scale-up of 1:50 or 1:100. However, the design idea itself seemed suggestive and very promising.

At this stage, readers may ask why I failed to quote any space fallout examples. NASA does have a set of case histories that are well documented and almost too well publicized. Liveth there an engineer who hath not heard of the "moonwalker" (Vehicle, Self-Propelled, Multifoot, Paraplegics, for the use of)?

Yes, there *is* fallout, but to determine its numerical magnitude and (more important) its economic impact would require a platoon of 007's. The nondisclosure propensities of government agencies (as sources) and private enterprises (as receivers) combine to form an almost perfect canopy. Thus, documenting fallout cases is next to impossible.

This is in no way a criticism of NASA. The RDC's simply have their hands tied when it comes to disclosure of successful information transfers. Companies paying a service charge have a legal right to discretion, for whatever reason, and there ends all thought of publicity. Hence, the matter reverts from the public domain to the individual company and to the individual design engineer.

Challenge to Creativity

If space fallout is to realize its large potential for technological and economic impact, then I predict that "direct transfer"—adapting space-created hardware to ground uses—will play only a relatively minor role. A space program is not *primarily* a scheme for generating exotic hardware. It *is* a confrontation with new problems and, at the same time, a new domain of thought for previously planet-bound minds.

For 16th Century Europeans, the fall of the Ocean Barrier not only opened new continents to exploration and settlement, but also played a major part in opening new areas of inquiry and accomplishment. To be sure, there were those who remained content to sit at home, physically and mentally, and follow old accustomed ways. Initially, they may have been a vast majority, but history shows that they lost all influence on the pattern of things to come. New concepts began to spread rapidly, first in direct adoption, but then increasingly in ever-changing adaptations.

For 20th Century Terrans, the fall of the Space Barrier presents a similar, but considerably larger challenge. Now that we are a fully technological society, engineers face a correspondingly larger responsibility: not merely to act as carriers of information, but more so as creators of new ideas. ■

Appendix V

FORMS AND STATIONERY

wesrac
WESTERN RESEARCH APPLICATION CENTER

GRADUATE SCHOOL OF BUSINESS ADMINISTRATION / UNIVERSITY OF SOUTHERN CALIFORNIA
LOS ANGELES, CALIFORNIA 90007 (213) 746-6133

CLIENT DATA WORK SHEET

NAME _____ CODE # _____

ADDRESS _____ DATE AGREEMENT _____

PHONE _____ APPLICATION ENGR. _____

AFFILIATION _____

ADDRESS _____

SALES VOL. _____ # LOCAL EMPLOYEES _____

TOTAL ASSETS _____ # R & D EMPLOYEES _____

KEY PERSONNEL (TITLES UNIVERSITY INTEREST LOCATION:)

1. _____
2. _____
3. _____
4. _____

PRIME R & D INTERESTS:

PRODUCTS/SERVICES:

R & D CAPABILITY:

COMMENTS:

DATE _____ REVISED _____

PRE-CALL CLIENT INTEREST FORM

NAME OF COMPANY _____

CODE NUMBER _____

PROBABLE INTEREST AREAS:

Signed _____ Date _____

MARKETING RESEARCH ASST.

CALL REPORT

COMPANY _____ DATE _____

_____

INTERVIEWED: (Name & Title)

SUBJECT AND RESULTS:

RECOMMENDATION OR CONCLUSION:

TECHNOLOGY DISSEMINATED:

Signed _____

CLIENT DATA RECORD

NAME _____ CODE # _____

ADDRESS _____ DATE AGREEMENT _____

PHONE _____

PARENT CO. _____

ADDRESS _____

SALES VOL. _____ # LOCAL EMPLOYEES _____

TOTAL ASSETS _____ # R & D EMPLOYEES _____

KEY PERSONNEL (TITLES LOCATION RELATIONSHIP)

PRODUCTS/SERVICES:

PRIME R & D INTERESTS AND CAPABILITY:

COMMENTS: AN. REP. DATE _____ APPLICATION ENGR. _____

_____

CONTACT	PRESENTATION	PROPOSAL	CONCLUSION

DATE _____ REVISED _____

WESRAC Search Information Sheet

Client: _____ Date of Request: _____

Address: _____ Date Results Needed: _____

_____ Phone: _____

Contract No.: _____ Search No.: _____

Client's Representative: _____

Field of Question: _____

Question:

Characteristics: (Include desired and acceptable limitations, etc.)

List descriptive terms and synonyms which indicate possible subject headings and/or search areas:

WESRAC's Representative: _____

Meeting Date: _____

Misc.: Present:

By: _____ Date: _____

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WESRAC Search Information Sheet (Appendix A)

Contract No. Search No. Sheet____ of ____

Descriptive terms for search as determined by Specialist:

By:_____ Date:_____

Approved by:_____ Date:_____

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